WHAT IS CLAIMED IS:

1. A motion editing apparatus for a legged mobile robot having a plurality of degrees of freedom in joints, and a sensor for measuring an external environment, comprising:

a data inputting unit for inputting motion data;

a data reproducing unit for reproducing said motion data on an actual apparatus;

a sensor information acquisition unit for acquiring the sensor information from said sensor during the time when said motion data is being reproduced;

a motion evaluation unit for evaluating the motion based on the acquired sensor information; and

a motion correction unit for correcting the motion data based on said results of evaluation.

2. The motion editing apparatus for the legged mobile robot according to claim 1 further comprising:

a motion data outputting unit for embedding the sensor information, acquired by said sensor information acquisition unit, in the motion data satisfying a criterium of evaluation in said motion evaluation unit, as reference data, and for outputting the resulting motion data having the reference data embedded therein.

3. The motion editing apparatus for the legged mobile robot according to claim 2 wherein said motion data outputting unit outputs the information on the angles of

joints, formed by the combination of angle command values for respective joints and measured values acquired on executing the motion, as the motion data having the reference data embedded therein.

4. The motion editing apparatus for the legged mobile robot according to claim 2 wherein said motion data outputting unit outputs the posture information composed of the combination of the target values for the respective sensors at the time of motion edition, measured values of sensor outputs at the time of motion execution and filtered values of said measured values of the sensor outputs, as the motion data having the reference data embedded therein.

5. The motion editing apparatus for the legged mobile robot according to claim 2 wherein said motion data outputting unit outputs the ZMP trajectory information formed by the combination of the target ZMP trajectory for left and right foot soles at the time of editing and the ZMP trajectory as corrected by stabilization control at the time of execution of the motion, as the motion data having the reference data embedded therein.

6. The motion editing apparatus for the legged mobile robot according to claim 2 wherein said motion data outputting unit outputs the foot sole touchdown information and/or the contact information formed by the combination of a target value at the time of editing of an output of a floor reaction force sensor and a measured value thereof at the time of motion execution as motion data, having the reference data embedded therein.

7. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion evaluation unit chronologically evaluates followup characteristics on executing the motion on the actual apparatus.

8. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion evaluation unit chronologically acquires a torque value of an actuator and the number of revolutions on executing the motion on an actual robot body and compares the acquired data to a NT curve representing the actuator characteristics of to evaluate whether or not there is any movement which surpasses the limit torque of the actuator.

9. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion evaluation unit calculates a difference between posture sensor values and the ZMP trajectory as scheduled at the time of the motion edition, and sensor values and the ZMP trajectory as acquired on executing the motion on an actual robot body to evaluate the posture.

10. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion evaluation unit calculates a difference between the posture at the time of motion edition and measured values obtained on executing the motion on the actual robot body to evaluate the touchdown and/or contact.

11. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion evaluation unit calculates the degree of improvement in measured values as to the motion corrected by last and previous evaluation events

to evaluate the degree of achievement of correction.

12. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion evaluation unit calculates the effect of an impact due to contact with an outside object on an actuator torque, ZMP trajectory or on the acceleration to evaluate the impact due to contact with the outside object.

13. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion correction unit corrects a command angle value to the actuator and/or corrects control parameters of the actuator based on the result of evaluation of response properties of the actuator.

14. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion correction unit changes the contents of the posture stabilization processing block based on the result of evaluation of the actuator torque.

15. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion correction unit changes the contents of the posture stabilization processing block based on the result of evaluation of the touchdown and/or contact.

16. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion correction unit changes the control of said posture stabilization processing block, as the contact with the outside object is taken into account, based on the result of evaluation of the impact due to contact with the outside object.

17. The motion editing apparatus for the legged mobile robot according to claim 1 wherein said motion reproducing unit takes out only an optional range of motion data to reproduce the range thus taken out on the actual apparatus.

18. The motion editing apparatus for the legged mobile robot according to claim 17 wherein said data reproducing unit sets a start time point in motion data, calculates the dynamic posture at said start time point, generates a transient motion with the dynamic posture at said start time point as a terminal point, and reproduces the motion on said actual apparatus using said transient motion; and

wherein said data reproducing unit also sets a stop time point in said motion data, calculates the dynamic posture at said stop time point, generates a transient motion with said stop posture as a start point and halts the movement of said actual apparatus using said transient motion.

19. A motion editing method for a legged mobile robot having a plurality of degrees of freedom in joints and a sensor for measuring an external environment, said method comprising:

a data inputting step of inputting motion data;

a data reproducing step of reproducing said motion data on an actual apparatus;

a sensor information acquisition step for acquiring the sensor information from said sensor during the time when said motion data is being reproduced;

a motion evaluation step of evaluating the motion based on the acquired

sensor information; and

a motion correction step of correcting the motion data based on said results of evaluation.

20. The motion editing method for the legged mobile robot according to claim 19 further comprising:

a motion data outputting step of embedding the sensor information acquired by said sensor information acquisition step in the motion data satisfying a criterium of evaluation in said motion evaluation step, as reference data, and for outputting the resulting motion data having the reference data embedded therein.

21. The motion editing method for the legged mobile robot according to claim 20 wherein said motion data outputting step outputs the information on the angles of joints, formed by the combination of angle command values for respective joints and measured values acquired on executing the motion, as the motion data having the reference data embedded therein.

22. The motion editing method for the legged mobile robot according to claim 20 wherein said motion data outputting step outputs the posture information composed of the combination of the target values for the respective sensors at the time of motion edition, measured values at the time of motion execution and filtered values of said measured values of the sensor outputs
as the motion data having the reference data embedded therein.

23. The motion editing method for the legged mobile robot according to claim 20

wherein said motion data outputting step outputs the ZMP trajectory information formed by the combination of the target ZMP trajectory for left and right foot soles at the time of editing and the ZMP trajectory following the correction by stabilization control at the time of execution of the motion as the motion data having the reference data embedded therein.

24. The motion editing method for the legged mobile robot according to claim 20 wherein said motion data outputting step outputs the foot sole touchdown information and/or the contact information formed by the combination of a target value at the time of editing of a floor reaction sensor and a measured value thereof at the time of motion execution as motion data having the reference data embedded therein.

25. The motion editing method for the legged mobile robot according to claim 19 wherein said motion evaluation step chronologically evaluates followup characteristics on executing the motion on the actual apparatus.

26. The motion editing method for the legged mobile robot according to claim 19 wherein said motion evaluation step chronologically acquires a torque value of an actuator and the number of revolutions on executing the motion on an actual robot body and compares the acquired data to a NT curve representing the actuator characteristics to evaluate whether or not there is any movement which surpasses the limit torque of the actuator.

27. The motion editing method for the legged mobile robot according to claim 19

wherein said motion evaluation step calculates a difference between posture sensor values and the ZMP trajectory as scheduled at the time of the motion edition, and sensor values and the ZMP trajectory as acquired on executing the motion on an actual robot body to evaluate the posture.

28. The motion editing method for the legged mobile robot according to claim 19 wherein said motion evaluation step calculates a difference between the posture at the time of motion edition and measured values obtained on executing the motion on the actual robot body to evaluate the touchdown and/or contact.

29. The motion editing method for the legged mobile robot according to claim 19 wherein said motion evaluation step calculates the degree of improvement in measured values as to the motion corrected by last and previous evaluation events to evaluate the degree of achievement of correction.

30. The motion editing method for the legged mobile robot according to claim 19 wherein said motion evaluation step calculates the effect of an impact due to contact with an outside object on an actuator torque, ZMP trajectory or on the acceleration to evaluate the impact due to contact with the outside object.

31. The motion editing method for the legged mobile robot according to claim 19 wherein said motion correction step corrects a command angle value to the actuator and/or corrects control parameters of the actuator based on the result of evaluation of response properties of the actuator.

32. The motion editing method for the legged mobile robot according to claim 19

wherein said motion correction step changes the contents of the posture stabilization processing block based on the result of evaluation of the actuator torque.

33. The motion editing method for the legged mobile robot according to claim 19 wherein said motion correction step changes the contents of the posture stabilization processing block based on the result of evaluation of the touchdown and/or contact.

34. The motion editing method for the legged mobile robot according to claim 19 wherein said motion correction step changes the control of said posture stabilization processing block, as the contact with the outside object is taken into account, based on the result of evaluation of the impact due to contact with the outside object.

35. The motion editing method for the legged mobile robot according to claim 19 wherein said motion reproducing step takes out only an optional range of motion data to reproduce the range thus taken out on the actual apparatus.

36. The motion editing method for the legged mobile robot according to claim 35 wherein said data reproducing step sets a start time point in motion data, calculates the dynamic posture at said start time point, generates a transient motion with the dynamic posture at said start time point as a terminal point, and reproduces the motion on said actual apparatus using said transient motion; and

wherein said data reproducing step also sets a stop time point in said motion data, calculates the dynamic posture at said stop time point, generates a transient

motion with said stop posture as a start point and halts the movement of said actual apparatus using said transient motion.

37. A computer program executing, in a computer readable form, a motion editing program for a legged mobile robot having a plurality of degrees of freedom in joints and a sensor for measuring an external environment, said computer program comprising:

a data inputting step of inputting motion data;

a data reproducing step of reproducing said motion data on an actual apparatus;

a sensor information acquisition step of acquiring the sensor information from said sensor during the time when said motion data is being reproduced;

a motion evaluation step of evaluating the motion based on the acquired sensor information; and

a motion correction step of correcting the motion data based on said results of evaluation.